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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,097	07/08/2003	Zhi-Wen Sun	AMAT/8241/CMP/ECP/RKK	1645
44257	7590	01/10/2006	EXAMINER	
PATTERSON & SHERIDAN, LLP 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056			WONG, EDNA	
			ART UNIT	PAPER NUMBER
			1753	
DATE MAILED: 01/10/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Advisory Action  
Before the Filing of an Appeal Brief**

Application No.

10/616,097

Applicant(s)

SUN ET AL.

Examiner

Edna Wong

Art Unit

1753

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 30 December 2005 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.  
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**NOTICE OF APPEAL**

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ They raise the issue of new matter (see NOTE below);  
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

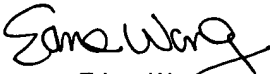
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
The status of the claim(s) is (or will be) as follows:  
Claim(s) allowed: \_\_\_\_\_.  
Claim(s) objected to: \_\_\_\_\_.  
Claim(s) rejected: 8-10, 20-22 and 31-33.  
Claim(s) withdrawn from consideration: \_\_\_\_\_.

**AFFIDAVIT OR OTHER EVIDENCE**

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See pages 2-10.  
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). \_\_\_\_\_.  
13. ☐ Other: \_\_\_\_\_.

  
Edna Wong  
Primary Examiner  
Art Unit: 1753

**ADVISORY ACTION**

This is in response to the Amendment dated December 30, 2005. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Response to Arguments***

Claim Rejections - 35 USC § 103

I. Claims **1-7 and 34** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1).

The rejection of claims 1-7 and 34 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. has been withdrawn in view of Applicants' amendment. Claims 1-7 and 34 have been cancelled.

II. Claims **8 and 9** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1) ~~as applied to claims 1-7 and 34 above~~, and further in view of **Dubin et al.** (US Patent No. 6,432,821 B1).

The rejection of claims 8 and 9 under 35 U.S.C. 103(a) as being unpatentable

over Miura et al. in combination with Baskaran et al. ~~as applied to claims 1-7 and 34 above~~, and further in view of Dubin is as applied in the Office Action dated October 4, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

III. Claim 10 has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1) as ~~applied to claims 1-7 and 34 above~~, and further in view of **Dubin et al.** (US Patent No. 6,432,821 B1) as applied to claims 8 and 9 above, and further in view of **Nagai et al.** (US Patent No. 6,709,563 B2).

The rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. ~~as applied to claims 1-7 and 34 above~~, and further in view of Dubin et al. is as applied to claims 8 and 9 above, and further in view of Nagai et al. is as applied in the Office Action dated October 4, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

IV. Claims 11, 13-15, 17-19 and 35 have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1).

The rejection of claims 11, 13-15, 17-19 and 35 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. has been withdrawn in view of Applicants' amendment. Claims 11, 13-15, 17-19 and 35 have been cancelled.

V. Claims **20 and 21** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1) ~~as applied to claims 11, 13-15, 17-19 and 35 above~~, and further in view of **Dubin et al.** (US Patent No. 6,432,821 B1).

The rejection of claims 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. ~~as applied to claims 11, 13-15, 17-19 and 35 above~~, and further in view of Dubin et al. is as applied in the Office Action dated October 4, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

VI. Claim **22** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1) ~~as applied to claims 11, 13-15, 17-19 and 35 above~~, and further in view of **Dubin et al.** (US Patent No. 6,432,821 B1) as applied to claims 20 and 21 above, and further in view of

**Nagai et al.** (US Patent No. 6,709,563 B2).

The rejection of claim 22 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. ~~as applied to claims 11, 13-15, 17-19 and 35 above~~, and further in view of Dubin et al. is as applied to claims 20 and 21 above, and further in view of Nagai et al. is as applied in the Office Action dated October 4, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

**VII.** Claims **23-28, 30 and 36** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1).

The rejection of claims 23-28, 30 and 36 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. has been withdrawn in view of Applicants' amendment. Claims 23-28, 30 and 36 have been cancelled.

**VIII.** Claims **31 and 32** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1) ~~as applied to claims 23-28, 30 and 36 above~~, and further in view of **Dubin et al.** (US Patent No. 6,432,821 B1).

The rejection of claims 31 and 32 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. ~~as applied to claims 23-28, 30 and 36 above~~, and further in view of Dubin et al. is as applied in the Office Action dated October 4, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

**IX.** Claim 33 has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Miura et al.** (US Patent Application Publication No. 2003/0155247 A1) in combination with **Baskaran et al.** (US Patent Application Publication No. 2004/0072419 A1) as ~~applied to claims 23-28, 30 and 36 above~~, and further in view of **Dubin et al.** (US Patent No. 6,432,821 B1) as applied to claims 31 and 32 above, and further in view of **Nagai et al.** (US Patent No. 6,709,563 B2).

The rejection of claim 33 under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in combination with Baskaran et al. ~~as applied to claims 23-28, 30 and 36 above~~, and further in view of Dubin et al. as applied to claims 31 and 32 above, and further in view of Nagai et al. is as applied in the Office Action dated October 4, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

Applicants state that the Examiner has not supplied the requisite motivation to combine Miura, which discloses depositing a copper seed layer by a sputtering technique and electrolytic copper plating to fill or half fill trenches or via holes, with

Baskaran, which discloses maintaining the alkaline electrolytic bath solution at a pH of at least about 9.0 and a citric acid bath solution has a suitable pH at about 9.5.

The Examiner has failed to show a clear and particular motivation by the skilled artisan to select from the entire disclosure of Baskaran, a reference to copper citrate for combination with Miura, while ignoring the remainder of Baskaran. On this point, the Federal Circuit has ruled that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” (*In re Fritch* at 1784).

The Examiner must show that the skilled artisan would be motivated to specifically select copper citrate from the eight potential copper sources listed in Baskaran for combining with Miura, despite Baskaran's failure to teach any particular advantages offered by copper citrate.

In response, Miura teaches that the copper ions may be added to the electrolytic copper plating solution in the form of salts (page 2, [0019], lines 3-4). Salts of copper with the later-described complexing agent are particularly preferred (page 2, [0020], lines 4-7). The later-described complexing agent includes oxycarboxylic acid (page 2, [0023]). The oxycarboxylic acid includes citric acid (page 2, [0027], line 2).

The salt of copper with citric acid is copper citrate. Thus, Miura teaches a copper solution containing complexed copper ions derived from a copper source of copper citrate.

Miura, *alone*, teaches copper citrate.



Applicants state that the same chemical components are maintained throughout the various steps disclosed by Dubin.

In response, Miura teaches that current-reverse electrolysis is effective (page 4, [0054]). Dubin teaches current-reverse electrolysis (col. 5, lines 4-11; and Fig. 7).

As to the chemical components, the rejection is not overcome by pointing out that one reference does not contain a particular limitation when reliance for that teaching is on another reference. *In re Lyons* 150 USPQ 741 (CCPA 1966). Moreover, it is well settled that one cannot show nonobviousness by attacking the references individually where, as here, the rejection is based on a combination of references. *In re Keller* 208 USPQ 871 (CCPA 1981); *In re Young* 159 USPQ 725 (CCPA 1968).

Furthermore, claims 8, 20 and 31 recite that the complexed copper solution contains complexed copper ions derived from copper citrate, copper borate, copper tartrate, copper oxalate, derivatives thereof and combinations thereof; and the second copper solution contains free-copper ions. The complexed copper solution is opened to contain free copper ions and the second copper solution is opened to contain complexed copper ions. Thus, the solutions are not so different as presently claimed.

The Examiner maintains that Miura teaches depositing a seed layer. The PVD or CVD deposited seed layer (page 4, [0050]) incompletely fills the trenches and via holes with copper (page 1, [005]). Miura teaches that his electrolytic copper plating solution reinforces the seed layer and adds thickness to the seed layer within the trenches or via

holes (page 4, [0051]). These teachings would have suggested to one having ordinary skill in the art that (at least a part of) the seed layer is electrodeposited.

Miura teaches that when the electrolytic copper plating solution is applied in the trenches or via holes of a silicon wafer, the trenches or via holes may be filled completely with copper using the electrolytic copper plating solution, or they may be filled halfway (= gap-fill) and then applied with a highly acidic or highly basic copper plating solution to be filled completely (= bulk-fill) [page 4, [0051]]. These teachings would have suggested to one having ordinary skill in the art that Miura discloses a gap-fill layer (=filled halfway) and a bulk-fill layer (= filled completely).

Applicants state that Nagai discloses these two plating liquids and remains completely silent to adding a leveling additive into the first plating liquid to form the second plating liquid. The Applicant does not find disclosure within Nagai of a third plating liquid or a third copper solution, as asserted by the Examiner.

In response, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Nagai teaches that using an additive for enhancing the leveling property would have given a flat plating surface. The use of the plating liquid

having excellent leveling property can retard the growth of plating at the inlet of a fine recess. This makes it possible to fully fill the fine recesses with copper uniformly without formation of any voids, and further flatten the plating surface (col. 17, line 37 to col. 18, line 2). These teachings would have suggested to those of ordinary skill in the art that adding a leveler to the copper solution would have given a flat plating surface without the formation of any voids.

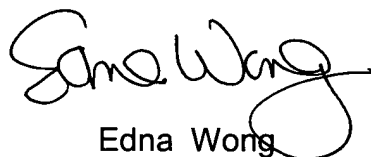
As to a third plating liquid or a third copper solution, the repetition of steps to provide the same results is within the skill of one having ordinary skill in the art. The concept of duplication is not patentable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Edna Wong  
Primary Examiner  
Art Unit 1753

EW  
January 5, 2006